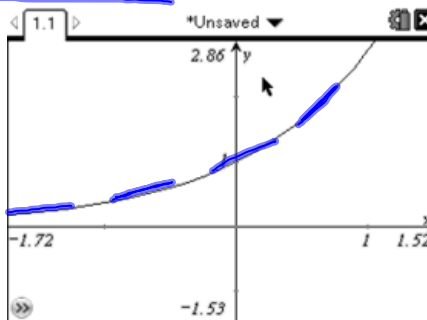


3.9a Derivatives of exponential functions

Sketch the derivative



$$y = e^x$$

$$y' = e^x$$

$$e \approx 2.71828 \dots$$

$$\frac{d}{dx} e^u = e^u \cdot \frac{du}{dx}$$

Oct 5-7:24 PM

Find dy/dx if

$$y = e^{x+x^2}$$

$$y' = e^{x+x^2} \cdot (1+2x)$$

$$y = x^2 e^x - e^{\sqrt{3x}}$$

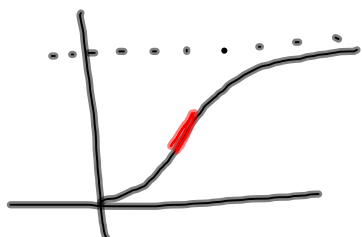
$$y' = x^2 \cdot e^x + e^x \cdot 2x - 3 \cdot \frac{1}{2} (3x)^{-\frac{1}{2}} \cdot e^{\sqrt{3x}}$$

Oct 5-7:29 PM

The spread of the flu in a certain school is modeled by the equation

$$y = \frac{100}{1 + e^{3-t}} \quad \text{How fast is the flu spreading after 3 days?}$$

$$y' = \frac{(1 + e^{3-t}) \cdot 0 - 100(-1) \cdot e^{3-t}}{(1 + e^{3-t})^2} \quad \Big|_{t=3}$$



$$\frac{100}{2^2} = 25$$

Oct 5-7:45 PM

Derivative of $y = a^x$

$$y = 2^x$$

$$y' = ? 2^x \ln 2$$

p 173

$$\frac{d}{dx} a^x = a^x \cdot \ln a$$

$$\boxed{\frac{d}{dx} a^u = a^u \ln a \frac{du}{dx}}$$

$$y = x^2 \quad \text{power}$$

$$y' = 2x$$

don't confuse

2^x with x^2

↑
no
power
rule

↑
power
rule

Oct 5-7:33 PM

At what point on the graph of $y = 2^t - 3$ does the tangent line have slope 21?

$$y' = 21$$

$$2^t \cdot \ln 2 = 21 \quad \text{solve for } t$$

$$t = 4.42$$

$$y = 2^{4.42} - 3 = 27.2$$

Oct 5-7:34 PM

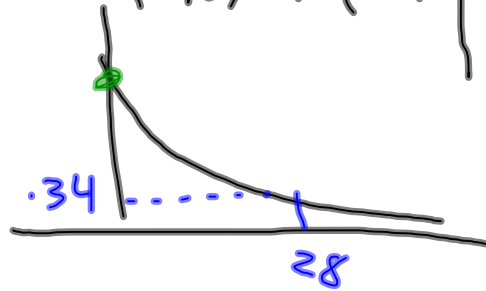
1.1 1.2 1.3 milk

A glass of cold milk from the refrigerator is left on the counter on a warm summer day. Its temperature y after sitting on the counter is $y = 72 - 30 \cdot (0.98)^t$

Oct 5-7:36 PM

$$y = 72 - 30(.98)^t$$

$$y' = -30(.98)^t \cdot \ln(.98) \Big|_{t=28} =$$



Oct 4-10:22 AM